CLAIMS

1. A microreactor for producing hydrogen by reforming a feed material, characterized by comprising:

a joined body having a pair of substrates joined together, a flow path formed by a microchannel portion formed on a joining surface of at least one of said substrates, and a catalyst carrying member disposed in said flow path.

2. A microreactor according to claim 1, wherein said catalyst carrying member comprises a metal base body, a metal oxide film covering said metal base body, and a catalyst supported on said metal oxide film.

3. A microreactor according to claim 2, wherein said metal oxide film is formed by anodic oxidation of said metal base body.

4. A microreactor according to claim 2, wherein said metal oxide film is formed by a boehmite treatment.

5. A microreactor according to claim 1, wherein said joined body is provided with a heater at at least one of said substrates.

6. A microreactor according to claim 5, wherein said heater is provided on said substrate via an insulating layer.

7. A microreactor according to claim 1, wherein said catalyst carrying member comprises an electric heater, a metal oxide film covering said electric heater, and a catalyst supported on said metal oxide film.

8. A microreactor according to claim 7, wherein said metal oxide film is formed by a boehmite treatment.

9. A microreactor according to claim 1, wherein said catalyst carrying member comprises an electric heater, a metal film covering said electric heater, a metal oxide film covering said metal film, and a catalyst supported on said metal oxide film.

10. A microreactor according to claim 9, wherein said metal oxide film is formed by anodic oxidation of said metal film.

11. A microreactor according to claim 9, wherein said metal oxide film is formed by a boehmite treatment.

12. A production method of a microreactor for producing hydrogen by reforming a feed material, characterized by comprising:

a channel forming step of forming a microchannel portion on one surface of at least one of a pair of

substrates for forming a joined body;

a catalyst applying step of forming a catalyst carrying member carrying a catalyst on the surface thereof; and

a joining step of disposing said catalyst carrying member in said microchannel portion and joining together said pair of substrates so as to confront each other, thereby forming the joined body having a flow path formed by said microchannel portion and having said catalyst carrying member in said flow path.

13. A production method of a microreactor according to claim 12, wherein said catalyst applying step forms a metal oxide film on the surface of a metal base body and applies the catalyst on said metal oxide film, thereby forming said catalyst carrying member.

14. A production method of a microreactor according to claim 13, wherein said metal oxide film is formed by anodic oxidation of said metal base body.

15. A production method of a microreactor according to claim 13, wherein said metal oxide film is formed by a boehmite treatment.

16. A production method of a microreactor according to claim 12, wherein said catalyst applying step covers an

electric heater with a metal oxide film and applies the catalyst on said metal oxide film, thereby forming said catalyst carrying member.

17. A production method of a microreactor according to claim 16, wherein said metal oxide film is formed by a boehmite treatment.

18. A production method of a microreactor according to claim 12, wherein said catalyst applying step covers an electric heater with a metal film, further covers said metal film with a metal oxide film, and applies the catalyst on said metal oxide film, thereby forming said catalyst carrying member.

19. A production method of a microreactor according to claim 18, wherein said metal oxide film is formed by anodic oxidation of said metal film.

20. A production method of a microreactor according to claim 18, wherein said metal oxide film is formed by a boehmite treatment.

21. A production method of a microreactor for producing hydrogen by reforming a feed material, characterized by comprising:

a channel forming step of forming a plurality of

microchannel portions on one surface of at least one of a pair of substrates for forming a joined body;

a catalyst applying step of forming catalyst carrying members each carrying a catalyst on the surface thereof;

a first joining step of disposing said catalyst carrying members in said microchannel portions and joining together said pair of substrates so as to confront each other, thereby forming the joined body having a plurality of flow paths formed by said plurality of microchannel portions, having said catalyst carrying member in each flow path, and having two end surfaces where both end opening portions of each flow path are exposed, respectively, and

a second joining step of joining terminating members comprising turnback flow paths to said two end surfaces where the opening portions of the flow paths of said joined body are exposed, thereby forming a single continuous flow path.

22. A production method of a microreactor according to claim 21, wherein said catalyst applying step forms a metal oxide film on the surface of a metal base body and applies the catalyst on said metal oxide film, thereby forming each catalyst carrying member.

23. A production method of a microreactor according to claim 22, wherein said metal oxide film is formed by anodic oxidation of said metal base body.

24. A production method of a microreactor according to claim 22, wherein said metal oxide film is formed by a boehmite treatment.

25. A production method of a microreactor according to claim 21, wherein said catalyst applying step covers an electric heater with a metal oxide film and applies the catalyst on said metal oxide film, thereby forming each catalyst carrying member.

26. A production method of a microreactor according to claim 25, wherein said metal oxide film is formed by a boehmite treatment.

27. A production method of a microreactor according to claim 21, wherein said catalyst applying step covers an electric heater with a metal film, further covers said metal film with a metal oxide film, and applies the catalyst on said metal oxide film, thereby forming each catalyst carrying member.

28. A production method of a microreactor according to claim 27, wherein said metal oxide film is formed by anodic oxidation of said metal film.

29. A production method of a microreactor according to

claim 27, wherein said metal oxide film is formed by a boehmite treatment.